NATIONAL ENERGY BOARD

REASONS FOR DECISION

In the Matter of an Application under
the National Energy Board Act

of

Dome Petroleum Limited

May 1979

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Ce rapport est publié
séparément dans les deux
langues officielles

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IN THE MATTER OF an application by Dome Petroleum Limited for a licence under Part VI of the National Energy Board Act for authorization to export ethane, filed with the Board under File No. 1543-D2-13.

HEARD at Ottawa, Ontario on:

4 April 1979

BEFORE:

J.G. Stabback	Presiding Member
J. Farmer	Member
J.R. Jenkins	Member

APPEARANCES:

R.C. Muir J.F. Scott	Dome Petroleum Limited
F.R. Foran	The Alberta Gas Ethylene Company Limited The Alberta Gas Trunk Line Company Limited
D.G. Gibson S. Karlsen	Columbia LNG Corporation
H.A. Fergusson	Dow Chemical of Canada, Limited
J. Manera	Northern and Central Gas Corporation Limited
R.W. Riegert	Pacific Petroleums Limited
W. Watt	Pan-Alberta Gas Limited
B.J. Sherman	PanCanadian Gas Products Limited
K.J. MacDonald	National Energy Board

Abbreviations of Names

Alberta Natural Gas	"ANG"
Alberta Energy Resources Conservation Board	"AERCB"
Alberta Gas Ethylene Company Limited	"AGEC"
Alberta Gas Trunk Line Company Limited	"AGTL"
Canadian Industries Limited	"CIL"
Canadian Utilities Ethane Limited	"CUE"
Cochin Pipeline Ltd.	"Cochin"
Columbia LNG Corporation	"Columbia LNG" or "Columbia"
Dome Petroleum Limited	"Applicant" or "Dome"
National Energy Board	"NEB" or "Board"
Pacific Petroleums Limited	"Pacific"
Shell Canada Resources Limited	"Shell"
In the Matter of an Application of Dome Petroleum Limited for Removal of Ethane under the Gas Resources Preservation Act - Energy Resources Conservation Board - May 1978	"AERCB Report 78-F"
Natural Gas Supply and Requirements - National Energy Board - February 1979	"1979 Gas Report"

Abbreviations of Terms

Barrels per day	B/D
British thermal units	Btu
Liquid Petroleum gas	LPG
Million barrels	MMB
Million British thermal units	MMBtu
Synthetic natural gas	SNG
Thousand barrels per day	MB/D
Thousand barrels per year	MB/YR

* * * * * *

Conversion Factor

1 barrel ethane = 0.157976 m^3 liquid ethane at 15° C and equilibrium pressure.

BACKGROUND

The ethane which is the subject of this application will be produced primarily in Alberta gas processing plants that are part of a world-scale petrochemical complex being developed in that province. Contractual arrangements provide for the purchase of the produced ethane by Alberta Gas Ethylene Company Limited for the production of ethylene at a plant now under construction at Joffre, Alberta, and a possible second plant projected for the mid-1980's. Any ethane surplus to the requirements for the manufacture of ethylene would be sold to Dome for transportation through the facilities of the Cochin-Dome pipeline system for sale to Columbia LNG at Green Springs, Ohio.

The Board previously authorized the construction of the Cochin pipeline under Certificate No. OC-29 and has granted licences for export through Cochin facilities of ethane under Licence GL-47, propane under Licence GL-31 and ethylene under Licences EYL-1-76 and EYL-2-76, details of which may be found in Board reports dated January 1976, July 1970 and June 1976, respectively.

The present application seeks authorization to export additional volumes of surplus ethane through the Cochin-Dome pipeline system, which is now in operation.

APPLICATION

In its application dated 7 June 1978, Dome Petroleum Limited applied for a 15-year licence commencing 1 January 1979 to export a total of 132,750,000 barrels of ethane in the following annual volumes:

	MMB
1 January 1979 - 31 December 1979	8.15
1 January 1980 - 31 December 1980	6.90
1 January 1981 - 31 December 1981	5.92
1 January 1982 - 31 December 1982	8.62
1 January 1983 - 31 December 1983	10.03
1 January 1984 - 31 December 1984	12.00
1 January 1985 - 31 December 1985	16.30
1 January 1986 - 31 December 1986	18.95
1 January 1987 - 31 December 1987	14.58
1 January 1988 - 31 December 1988	11.97
1 January 1989 - 31 December 1989	8.24
1 January 1990 - 31 December 1990	4.84
1 January 1991 - 31 December 1991	3.81
1 January 1992 - 31 December 1992	1.78
1 January 1993 - 31 December 1993	0.66
	132.75

In addition to these volumes, the Applicant requested a ten per cent operating tolerance plus a make-up provision which would allow Dome to export an amount equal to any shortfall between approved volumes and actual volumes in previous years.

In support of its application, the Applicant provided evidence to show that the ethane to be exported was surplus to reasonably foreseeable Canadian requirements, and stated that the export of this ethane was in Canada's public interest.

At the commencement of the hearing, the Applicant referred to the Board's 1979 Gas Report in which it was stated that "it would be more appropriate to treat ethane in a manner similar to other natural gas liquids being extracted than as natural gas for the purpose of surplus determination", and that the calculation of an ethane surplus "will compare the expected ethane supply from extraction plants for each year with the expected domestic requirements plus authorized ethane exports. An annual ethane surplus will be considered to exist to the extent that expected ethane availability exceeds expected Canadian demand plus authorized exports."

Based on that finding of the Board, Dome was permitted to withdraw certain information filed in support of its application which was no longer relevant to it.

Dome filed its application in 1978 and thus filed all data in Imperial units. Effective 1 January 1979 the Board converted to the SI system of measurement and as a consequence the decision on this export application will be expressed in SI units.

EVIDENCE

Ethane Supply and Demand

Dome noted that it had adopted the AERCB forecast of ethane supply and demand contained in AERCB Report 78-F. This was the latest review in the public domain at the time of preparation of its application. That forecast was based on assumption of only modest additional removals of gas from Alberta and on the current Alberta Board protection formula which included some 2-1/2 years of gas reserve growth assuming ultimate potential reserves in Alberta of 110 trillion cubic feet.

It appeared to Dome that the recent Board forecast contained in its 1979 Gas Report did not incorporate such restrictive assumptions regarding new gas removal permits from Alberta and also was based on a somewhat higher ultimate potential gas volume in Alberta. Dome concluded that the result would be a minimum of approximately 120 MB/D of ethane over the next 20 to 22 years as compared to the declining supply which had been adopted by Dome in its submission.

Dome's forecast of demand for ethane, also adopted from AERCB Report 78-F, included requirements for future solvent flood schemes and feedstock requirements for the Canadian Industries Limited Edmonton ethylene plant, the AGEC Joffre ethylene plant, and a second major ethylene plant after 1985.

Dome applied for an export licence with annual volumes equal to the difference between the sums of the volumes contained in its two AERCB removal permits (DP 73-1 and DP 78-2) and its current NEB ethane export Licence GL-47. However, Dome did not take into account the effect of its make-up volume which is contained in GL-47. This make-up volume is calculated to be the difference between Dome's approved export volume for 1978 of 14.1 million barrels and its actual export of 4.2 million barrels in that year, a difference of 9.9 million barrels. According to the terms of the licence, Dome is permitted to export this difference during the period 1982-1985. As the make-up volume, together with the export volume applied for, exceeds the volumes contained in the removal permits for those years, the Applicant stated that if it were to exercise the make-up provision it would apply to the AERCB for an additional removal permit.

In relating its applied for licence volumes to its adopted AERCB surplus, Dome showed that there would still be a net overall surplus of ethane if a new licence were granted. Under cross-examination by PanCanadian it was established that Dome's application relied significantly upon the AERCB's "Potential New Supplies" of ethane as early as 1981. Dome agreed that the magnitude of the AERCB's "Potential New Supplies" would not likely be realized until construction of

the anticipated second ethylene plant in 1986 provided the necessary demand for additional ethane extraction facilities in Alberta.

Ethane Purchase Contracts

AGEC has agreements with the owners of the ethane extraction plants at Cochrane, Empress, Edmonton and Waterton, to purchase and take delivery of ethane products at the plant outlets. Dome in turn has an agreement with AGEC to purchase all ethane available to AGEC except that required for AGEC's first ethylene plant. The Dome-AGEC agreement has a provision whereby Dome is required to take and pay for up to 44,000 barrels of ethane a day when that amount is available.

Capacity and Expected Throughputs of the Cochin Pipeline

The Applicant stated that a transportation agreement had been entered into with Cochin Pipe Lines Ltd. and Dome Pipeline Corporation. In this agreement, the two pipeline companies had agreed to provide the facilities to transport ethane and other natural gas liquids from a point near Fort Saskatchewan, Alberta, to Windsor and Sarnia, Ontario (see map, Appendix I). The Applicant also supplied evidence which illustrated that the average daily capacity of the Cochin-Dome pipeline system transporting ethane, ethylene, and propane from Fort Saskatchewan to Windsor was 76.5 MB/D. It was also stated that, on a short term basis, the capacity could be as high as 97 MB/D.

The Applicant also supplied evidence with respect to the projected annual throughput of the pipeline system. It was shown that, other than for the year 1979, the annual throughput of the pipeline system would be less than the average daily capacity of 76.5 MB/D (see Appendix II).

Export Contract with Columbia LNG

Dome has entered into an agreement with Columbia LNG Corporation to supply Columbia during a 15-year term commencing in 1974, with a quantity of natural gas liquids which would include the quantity of ethane for which a licence is now being sought.

Pursuant to the terms of the contract, Dome has exercised an option to increase its annual contract quantity in the year commencing 1 September 1979 to a total of 99,750,000 MMBtu (the maximum allowable under the contract), with the natural gas liquids originating from sources in the United States as well as Canada. As a result, the ethane which is the subject of this application represents only a portion of Dome's contractual obligation to Columbia LNG.

Pricing Tests

Dome reviewed the price to be received for the proposed ethane exports in the context of the three price tests used by the Board in determining whether export prices are just and reasonable.

First Price Test

With reference to the first price test for the proposed export of ethane, namely, that the export price must recover its appropriate share of the costs incurred, Dome noted that the Board had found in its decision of January, 1974 that the first price test was met with respect to ethane exports to Columbia LNG.

Dome stated that there had been no changes in the terms of the Columbia LNG contract affecting ethane revenues and the margin between costs and revenue had been maintained. Dome concluded therefore that the export price of ethane meets the Board's first price test.

According to the contract, the net cost of sales is the sum of:

		Cdn.$/MMBtu
a)	Fort Saskatchewan unit product payment pursuant to the Ethane Sales Agreements	$2.56
b)	Fort Saskatchewan ethane storage charge	0.04
c)	Cochin-Dome tariffs	
	Canadian segment	0.29
	U.S. segment	0.83
d)	Windsor ethane storage charge	0.02
e)	Windsor to Green Springs tariff	0.11
f)	Shippers' working capital	0.04
	TOTAL	$3.89

The sales revenue per MMBtu is the Columbia LNG contract commodity charge of $3.92 plus the Columbia LNG contract demand charge of $0.09, a total of $4.01. (The contract commodity charge of $3.92 is the average of $3.77/MMBtu from 1 January 1979 to 30 June 1979 and $4.06/MMBtu from 1 July 1979 to 31 December 1979.)

Expressed in terms of Canadian currency, the margin would be $4.01 less 3.89, or $0.12 per MMBtu taxed at 48 per cent to yield a net margin of $0.06 per MMBtu in 1979. Net margins of $0.13 per MMBtu and $0.17 per MMBtu were calculated for the years 1981 and 1983, respectively.

Cross-examination revealed that the filed tariffs on the Cochin-Dome pipeline system are $0.33 per MMBtu for the Canadian segment and $1.00 Cdn. per MMBtu for the U.S. segment. Also the posted tariff on the Windsor to Green Springs pipeline is $0.22 Cdn. per MMBtu.

Dome explained that the presently filed tariffs are based on 1978 tariffs and that Dome used its best estimate of what the tariffs will be in 1979 in the forecast of revenues and expenses.

In response to a question concerning the possibility of the selling price being less than the cost incurred, Dome stated that "it would be mathematically possible for that to happen; however, as both the crude oil and gas prices are rising, we expect a positive margin to continue".

Second Price Test

With respect to the second price test that the export price should, under normal circumstances, be not less than the price to Canadians for similar deliveries in the same area, Dome stated that at the present time there is no factual basis upon which to make a direct comparison of prices. However, Dome noted that the current Toronto city gate price of natural gas to eastern Canadian natural gas distributors is $2.00 per MMBtu and, considering that the prevailing ethane export price is $3.77 per MMBtu, it is clear that the selling price of ethane is higher than the price to Canadians for natural gas.

Third Price Test

The third price test states that the export price of gas should not result in prices in United States market areas materially less than the least cost alternative for energy.

At the present time the least cost alternative energy source in the general market area appears to be indigenous U.S. natural gas, and the least cost SNG feedstock is considered to be U.S. indigenous LPG or U.S. ethane-LPG mix.

A comparison of the cost of alternative energy sources in the market area was given as follows:

		1979 Prices $Cdn/MMBtu January	March
a)	U.S. natural gas price	2.98	3.02
b)	U.S. Indigenous LPG prices f.o.b. Lima, Ohio Propane - SNG feed	2.68	3.02
	Normal Butane - SNG feed	3.37	4.25
c)	U.S. Indigenous Ethane LPG Mixes via pipeline for SNG feed	2.69	2.98

These prices compare to the present Canadian ethane export price of $3.77 per MMBtu under the Columbia-Dome contract, which price is expected to be $4.06 per MMBtu in July 1979. These prices exclude the demand charge of $0.09/MMBtu.

Dome concluded therefore that the export price of ethane meets the Board's three price tests.

Projected Canadian Benefits

The benefits to be derived from the overall project were quantifiable only with respect to the effect on the Canadian balance of payments. Dome stated that this ethane export would contribute $2.2 billion to the balance of payments over the term of the export licence. Other benefits were primarily related to resource upgrading, job creation and additional resource and manufactured product revenues. The figure of $2.2 billion was Dome's most recent estimate of the value of the ethane export and was predicated on "a six per cent increase in crude oil prices on a long term basis with a somewhat quicker increase in the first three to four years".

Flexibility In Annual Licensed Volumes

In addition to the annual volumes included in its application, Dome has requested that a make-up clause be included in any licence issued by the Board. Such a clause would permit Dome to export any shortfall between the annual licence volumes and actual volumes at some future time during the term of the licence. Dome also requested that an annual operating tolerance be permitted, under which Dome could exceed the annual volumes stated, by up to ten per cent in each year of the term of the licence, with the provision that the total export approval of 132,750,000 barrels would not be exceeded. In support of these proposed provisions, Dome contended that such flexibility was necessary so that plant shutdowns, turnarounds, etc., at the Columbia plant and/or the ethane plants in Alberta, could be accommodated, as they may result in Dome not being able to deliver, or Columbia not being able to take, all the ethane in a given annual period.

In the event that Columbia were not able to take delivery of the annual volumes of ethane requested in this application and alternate export customers were acquired, the Applicant stated that it would not object "to the inclusion in any licence which may be issued pursuant to this hearing, of a condition similar in terms to condition 4 of GL-47 which requires ethane exported under GL-47 to be sold for an amount not less than the amount arrived at by applying a price computed according to the Columbia agreement".

INTERVENTIONS

Eight of the twelve parties who had filed written interventions appeared at the hearing. None of the intervenors presented evidence, and those who took a position on whether or not a licence should be granted, supported the Dome application.

One intervenor, PanCanadian Gas Products Limited in its final argument recommended that "if the Board grants Dome a licence, in its deliberations, we would recommend that they consider limiting the volumes to be exported to that which Dome actually own and to volumes that are to be delivered to Columbia LNG Corporation."

It was Dome's view that such conditions would be dangerous, as the licensee would have to show on a day-by-day, hour-by-hour basis, whether the ethane to be exported was under its control (ownership), and as a result Dome submitted that such a condition should not be included in the licence.

VIEWS OF THE BOARD

In assessing this application for the exportation of ethane over a 15-year period, the Board has given careful consideration to all the evidence and submissions as presented.

The Board recognizes the inter-relationship of this export of ethane with the entire petrochemical project being undertaken in Alberta: the export would affect ethane and ethylene production, transportation, storage and sales, as well as throughput of the Cochin pipeline system. The certificates issued in connection with the construction and operation of the Cochin pipeline as well as the licences issued for the exportation of ethane, ethylene and propane were previously determined to be in the public interest, and the Board finds that the export of the additional volumes of ethane in respect of this application is consistent with its earlier findings regarding the public interest.

The Board has prepared its own forecast of ethane availability as shown in Appendix III. Its forecast of supply from the existing extraction plants at Cochrane, Edmonton, Empress and Waterton represents the ethane component of the reprocessing shrinkage forecast in the 1979 Gas Report. The CIL Edmonton plant forecast, which has equal supply and demand components, was adopted from AERCB Report 78-F and has been included in the Board's forecast of both supply and demand.

The Board's forecast of Canadian demand for ethane is shown in Appendix IV. The Board has adopted the ethane requirements for solvent floods from AERCB Report 78-F. The current export demand consists of Licence GL-47 volumes plus the GL-47 make-up volumes forecast for the period 1982 - 1985.

Appendix IV also shows the quantity of ethane surplus to the reasonably foreseeable requirements for use in Canada over the period of the application, the volumes applied for and the resulting volumes available for export.

Although Appendix IV indicates that there will be a surplus of ethane throughout the period covered by the application, the Board is not satisfied that present contractual arrangements include the volumes of ethane projected to be available from the expansion of processing facilities at Empress in 1986.

In assessing the Cochin-Dome pipeline throughput estimates, the Board believes that the system is capable of transporting on an annual basis, 76.5 MB/D of ethane and natural gas liquids from Fort Saskatchewan, Alberta to Windsor, Ontario. The Board also accepts that the pipeline system is capable of transporting those volumes at present under licence plus the additional export volumes proposed.

With respect to the export price to be received for ethane pursuant to the Columbia LNG contract, the Board agrees that this contractual price meets the second and third price

tests. As to the first price test, i.e., that the export price must recover its appropriate share of the costs incurred, the Board noted that the costs associated with the export of the ethane to Columbia, referred to on page 9 herein, are independent of the sales revenue pursuant to the contract, and could therefore exceed the selling price in the initial years of the term of the proposed licence. However, the Board expects that the current price relationship between crude oil and natural gas will continue and that a positive margin between cost and sale prices of ethane exports will continue. The Board notes Dome's statement that these tariffs would be refiled with the respective Canadian and United States authorities in order to reduce the charges on the pipeline system to the level indicated in the export application. Without prejudging any rate case for the Cochin pipeline in Canada, the Board notes that if the tariffs were changed along the lines indicated by Dome, the first price test would be met. Further, if the tariffs remain as they are at present, even though the first price test will not be met in the initial years, it is the view of the Board based on the evidence filed at the hearing, that this test will be met at least from the beginning of 1983 onward until the end of the licence. In these circumstances, it is the finding of the Board that the price to be charged by Dome for the ethane to be exported is just and reasonable in relation to the public interest.

DISPOSITION

Based on the evidence filed by Dome at the hearing and on the Board's supply and demand forecast for ethane from its 1979 Gas Report, which was referred to in the hearing, the Board is prepared to issue a licence with the approved annual volumes as set out in Appendix IV. It is the finding of the Board that the quantity of ethane set out in Appendix IV does not exceed the surplus remaining after due allowance has been made for the reasonably foreseeable requirements for use in Canada.

It should be noted that the approved volumes contain significant reductions from those applied for in the years 1982 to 1985, which reductions are primarily due to the GL-47 make-up volumes. The Board believes that it must take these potential exports into account as a failure to do so would result in an export which is greater than the available surplus. Further, it is the view of the Board that the total volume of exports should not be greater than the volumes allowed under the AERCB removal permits DP-73-1 and DP-78-2. Therefore, in calculating the surplus of ethane available for export, the Board has made the assumption that the exports of the make-up volumes under GL-47 will occur in equal annual amounts. However, as there is no such restriction in Licence No. GL-47 and as Dome may export the make-up volume according

to its own schedule, the Board has decided that the export of this make-up volume will be monitored on an annual basis and the licence will be conditioned in order to allow the Board to adjust the licensed amount in the years 1982 to 1985 such that the total exports do not exceed the volume the Board has found to be surplus.

A further condition results from the Board's concern about the contractual arrangements for the purchase of additional volumes of ethane to be available from the expansion of facilities at Empress in 1986. The Board will require the Applicant to satisfy it by 28 June 1985 that Dome owns or controls the volumes contained in the licence for the period 1986 to 1993 inclusive.

With respect to the Applicant's request for a ten per cent operating tolerance and a make-up volume in this licence, it is the decision of the Board not to permit the ten per cent operating tolerance or the make-up of volumes requested by the Applicant as either of these factors may result in the approved export volumes exceeding both the surplus found by the Board and the volumes granted in the removal permits by the AERCB.

The Board is also satisfied that the price as determined by the contract between Dome and Columbia LNG meets the requirements of the second and third price test. Whether the first price test is met by the selling price or not is a more difficult question. It appears that on the basis of the

tariffs at present in effect over both the Canadian and United States portions of the Cochin-Dome pipeline system, the selling price in the initial years of the licence will not completely recover all costs.

The Board has decided that the Applicant must maintain and provide to the Board on an annual basis information relating to:

(i) the selling price of ethane from AGEC to Dome,

(ii) the storage costs related to the ethane at Fort Saskatchewan and Windsor,

(iii) the Cochin pipeline tariffs for the transmission of ethane from Fort Saskatchewan to Windsor,

(iv) the Eastern Delivery System tariff for the transmission of ethane from Windsor to Green Springs, Ohio.

The terms and conditions of the licence to be issued are set out in Appendix V.

As all or part of the ethane which is to be exported at Elmore, in the Province of Saskatchewan, may subsequently be imported at Windsor, in the Province of Ontario and also re-exported at that point, the Board will condition the licence in order to give Dome the authority to import at Windsor ethane previously exported at Elmore.

The foregoing constitutes our reasons for decision and decision in this matter.

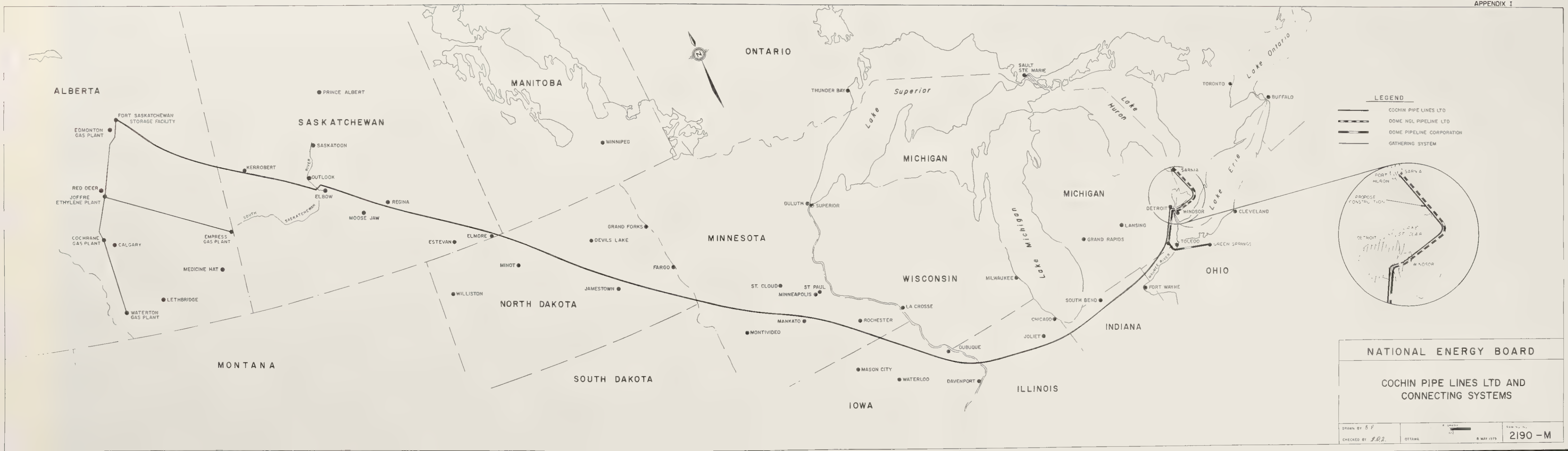
J. G. Stabback

Presiding Member

J. Farmer

Member

Member



NATIONAL ENERGY BOARD

COCHIN PIPE LINES LTD AND CONNECTING SYSTEMS

DRAWN BY B P
CHECKED BY J.D.Q.
OTTAWA
8 MAY 1979
2190 – M

COCHIN PIPELINE LTD.

HYDROCARBON THROUGHPUT PROJECTIONS

(thousands of barrels per day)

YEAR	ETHANE GL-47 (1)	ETHANE NEW VOLUMES (2)	ETHANE TOTAL	ALBERTA ETHYLENE	ALBERTA SPEC. PROPANE (3)	TOTAL COCHIN THROUGHPUT
1979	38.4	22.3	60.7	1.2	15.4	77.3
1980	38.1	18.9	57.0	7.9	8.2	73.1
1981	35.6	16.2	51.8	11.5	9.3	72.6
1982	27.1	23.6	50.7	7.6	12.6	70.9
1983	24.4	27.5	51.9	6.6	12.5	71.0
1984	20.5	32.9	53.4	6.6	11.5	71.5
1985	7.9	44.7	52.6	6.6	12.0	71.2
1986	-	51.9	51.9	6.6	12.5	71.0
1987	-	39.9	39.9	6.6	20.5	67.0
1988	-	32.8	32.8	6.6	25.2	64.6
1989	-	22.6	22.6	6.6	32.0	61.2
1990	-	13.3	13.3	6.6	35.8	55.7
1991	-	10.4	10.4	6.6	37.6	54.6
1992	-	4.9	4.9	6.6	39.5	51.0
1993	-	1.8	1.8	6.6	41.5	49.9

NOTES:

(1) total GL-47 licence is 84.2 MMB. including 14.1 MMB for 1978.

(2) NEB licence volumes during 1982-1985 may vary depending upon actual ethane volume exported during 1978.

(3) Alberta Specification Propane volumes limited by pipeline capacity, considering seasonality of propane shipments.

NEB FORECAST OF ETHANE AVAILABILITY
(MB/YR)

	SUPPLY AVAILABLE FROM EXISTING PLANTS							FUTURE SUPPLY	TOTAL SUPPLY
Year	Cochrane ANG	Edmonton Dome/CUE	Empress Dome	Empress Pacific	Waterton Shell	Edmonton CIL	TOTAL	Empress Expansion	
1979	10,651	4,990	5,475	2,646	1,669	923	26,354	-	26,354
1980	10,629	4,718	5,490	9,882	1,545	926	33,190	-	33,190
1981	10,636	4,749	5,475	9,855	1,564	923	33,202	-	33,202
1982	10,410	5,493	5,475	9,855	1,687	923	33,843	-	33,843
1983	10,636	5,592	5,475	9,855	1,709	923	34,190	-	34,190
1984	10,643	5,702	5,490	9,882	1,895	926	34,538	-	34,538
1985	10,640	5,778	5,475	9,855	1,793	923	33,540	-	33,540
1986	10,632	5,796	5,475	9,855	1,585	923	34,266	9,127	43,393
1987	10,632	5,475	5,475	9,855	1,400	923	33,760	9,127	42,887
1988	10,614	4,879	5,490	9,882	1,236	926	33,027	9,150	42,177
1989	10,519	3,975	5,475	9,855	1,113	923	31,860	9,127	40,987
1990	10,607	4,073	5,475	9,855	742	923	31,675	9,127	40,802
1991	10,607	4,453	5,475	9,855	680	923	31,993	9,127	41,120
1992	10,636	5,574	5,490	9,882	640	926	33,148	9,150	42,298
1993	10,607	5,720	5,475	9,855	578	923	33,158	9,127	42,285

- All forecasts represent the ethane component of the reprocessing shrinkage forecast in the 1979 Gas Report except the forecast for the CIL Edmonton plant which was adopted from AERCB report 78-F.

NEB ETHANE SUPPLY/DEMAND BALANCE

		DEMAND (MB/YR)							New Export Licence	
		Ethylene	Solvent	GL-47	GL-47 Export	TOTAL		Applied for by		
Year	SUPPLY[1]	Feedstock	Flood [2]	Export	Makeup	DEMAND	SURPLUS	Dome	MB/YR	10^3 m^3/yr [3]
1979	26,354	1,524	499	14,000	-	16,023	10,331	8,149	8,149	1 287
1980	33,190	10,951	-	13,900	-	24,851	8,339	6,897	6,897	1 090
1981	33,202	12,130	548	13,000	-	25,678	7,524	5,917	5,917	935
1982	33,843	13,308	1,095	9,900	2,486	26,789	7,054	8,617	7,054	1 114
1983	34,190	13,308	1,643	8,900	2,486	26,337	7,853	10,034	7,853	1 241
1984	34,538	13,344	2,196	7,500	2,486	25,526	9,012	12,006	9,012	1 424
1985	33,540	13,308	2,190	2,900	2,484	20,882	12,658	16,301	12,658	2 000
1986	43,393	23,915	2,190	-	-	26,105	17,288	18,945	17,288	2 731
1987	42,887	25,094	2,190	-	-	27,284	15,603	14,583	14,583	2 304
1988	42,177	25,163	2,196	-	-	27,359	14,818	11,973	11,973	1 891
1989	40,987	25,094	2,190	-	-	27,284	13,703	8,237	8,237	1 301
1990	40,802	25,094	2,190	-	-	27,284	13,518	4,844	4,844	765
1991	41,120	25,094	1,643	-	-	26,737	14,383	3,809	3,809	602
1992	42,298	25,163	1,098	-	-	26,261	16,037	1,775	1,775	280
1993	42,285	25,094	548	-	-	25,642	16,643	660	660	104
TOTAL	564,806	277,584	22,416	70,100	9,942	380,042	184,764	132,747	120,709	19 069

(1) From Appendix II

(2) From AERCB Report 78-F

(3) 10^3 m^3 of liquid ethane at 15°C and equilibrium pressure

Terms and Conditions of Licence

1. The term of this licence shall commence on the date of approval by the Governor in Council, and shall end on the 31st day of December, 1993.

2. The quantity of liquid ethane at 15°C that may be exported under the authority of an in accordance with this licence shall not exceed

(a) over the period commencing on the date of approval by Governor in Council and ending on the 31st day of December, 1979, 1 287 000 m^3;

(b) over the period commencing on the 1st day of January, 1980 and ending on the 31st day of December, 1980, 1 090 000 m^3;

(c) over the period commencing on the 1st day of January, 1981 and ending on the 31st day of December, 1981, 935 000 m^3;

(d) over the period commencing on the 1st day of January, 1982 and ending on the 31st day of December, 1982, 1 114 000 m^3;

(e) over the period commencing on the 1st day of January, 1983 and ending on the 31st day of December, 1983, 1 241 000 m^3;

(f) over the period commencing on the 1st day of January, 1984 and ending on the 31st day of December, 1984, 1 424 000 m^3;

(g) over the period commencing on the 1st day of January, 1985 and ending on the 31st day of December, 1985, 2 000 000 m^3;

(h) over the period commencing on the 1st day of January, 1986 and ending on the 31st day of December, 1986, 2 731 000 m^3;

(i) over the period commencing on the 1st day of January, 1987 and ending on the 31st day of December, 1987, 2 304 000 m^3;

(j) over the period commencing on the 1st day of January, 1988 and ending on the 31st day of December, 1988, 1 891 000 m^3;

(k) over the period commencing on the 1st day of January, 1989 and ending on the 31st day of December, 1989, 1 301 000 m^3;

(l) over the period commencing on the 1st day of January, 1990 and ending on the 31st day of December, 1990, 765 000 m^3;

(m) over the period commencing on the 1st day of January, 1991 and ending on the 31st day of December, 1991, 602 000 m^3;

(n) over the period commencing on the 1st day of January, 1992 and ending on the 31st day of December, 1992, 280 000 m^3;

(o) over the period commencing on the 1st day of January, 1993 and ending on the 31st day of December, 1993, 104 000 m^3;

(p) in any event, the total volume of exports over the term of this licence shall not exceed 19 069 000 m^3.

3. Notwithstanding condition 2, if the export of the make-up volumes pursuant to Licence GL-47 exceeds 392 728 cubic metres of liquid ethane per year in any of the periods shown in paragraphs (d), (e), (f) and (g) of condition 2 the amount authorized for export in those paragraphs shall be adjusted downward by an amount equal to the amount by which the export of make-up volumes exceeded 392 728 cubic metres of liquid ethane in each period.

4. Notwithstanding condition 2, the Licensee may export only that ethane obtained from the processing of gas at the plant operated at Cochrane, Alberta by Alberta Natural Gas Company Limited, the two plants operated at Empress by Dome Petroleum Limited and Pacific Petroleums Limited, the plant operated at Edmonton by Dome Petroleum Limited and Canadian Utilities Ethane Limited, and the plant operated at Waterton by Shell Canada Resources Limited, unless otherwise authorized by the Board.

5. The Licensee may, in each period set forth in condition 2, import at a point on the international boundary line between Canada and the United States of America, near Windsor, in the Province of Ontario, all or any part of the ethane exported hereunder during each such period at a point on the international boundary line near Elmore, in the Province of Saskatchewan.

6. The Licensee may, in each period set forth in condition 2, export at a point on the international boundary line between Canada and the United States of America, near Windsor, in the Province of Ontario, all or any part of the ethane imported pursuant to condition 5.

7. The Licensee shall by the 28th day of June 1985, file evidence to satisfy the Board that the Licensee has under contract those volumes of ethane which it wishes to export between the 1st day of January 1986 and the 31st day of December, 1993.

8. The ethane to be exported hereunder shall be sold for not less than the amount arrived at by applying to the quantities of ethane exported the price determined according to the terms of an agreement between Dome Petroleum Limited and Columbia LNG Corporation, dated 8 January, 1973, as filed with the Board.

9. The Licensee shall file with the Board prior to the 31st day of December, in each year of the term of the licence with the exception of 1979, such information as the Board may request with respect to:

(1) the selling price of ethane from the Alberta Gas Ethylene Company Limited to Dome Petroleum Limited,

(2) the storage costs related to the ethane at Fort Saskatchewan and Windsor,

(3) the Cochin pipeline tariffs for the transmission of ethane from Fort Saskatchewan to Windsor,

(4) the Eastern Delivery System tariff for the transmission of ethane from Windsor to Green Springs, Ohio.

10. The Licensee shall, within 30 days of the end of each month comprised in the term of this licence, file with the Board a report setting forth for each such month the total quantity of ethane exported hereunder, and the total revenues derived from the sales of ethane so exported.

11. The quantity of ethane which is to be exported hereunder shall at all times be measured by the Licensee in such a manner, by such facilities and at such locations as are from time to time specified or approved by the Board, such specification or approval to be provided by means of a letter signed by the Secretary of the Board.